

CONTACT LENS HANDLING AND INSERTING DEVICE AND STORAGE CONTAINER

BACKGROUND OF THE INVENTION

- 5 The present invention relates to the field of contact lenses.
- Contact lenses are normally placed on a user's cornea for use and are removed for storage, disposal or cleaning. This requires a user to remove the lens by hand and actually touch the lens, thereby introducing the possibility that the lens will become contaminated.
- 10 When cleaning the lens, the user will remove the lens, clean the lens and reinsert the lens. Therefore, a need exists for a device which allows the user to remove, clean, and reinsert a contact lens without requiring the user to touch the lens with his or her hands.
- 15 When the lens is put into a storage container, it is often difficult for the user to grasp the contact lens which is normally stored in a liquid solution. When the lens is immersed in the storage liquid, grasping of the lens is much more difficult than when the lens is not immersed in a storage liquid. Therefore, a storage container is needed which permits easy transfer of the storage liquid away from the lens while the lens is still in the storage container thereby permitting easier grasping of the lens by the
- 20 user.
- A need also exists for a contact lens storage container which permits easy removal or inversion of the contact lens.

SUMMARY OF THE INVENTION

- 25 The present invention is directed to a contact lens inserting and handling device which permits a user to insert a contact lens from a wearer's eye, handle the lens and release or transfer the lens. The lens can be transferred to a storage device such as a storage container using the inserting and handling device or the lens can be removed from such a storage device.
- 30 In accordance with the present invention, it is an object to provide an improved container for storage of contact lenses which allows for easy grasping and removal of the contact lens and easy reversal of the concavity of the contact lens or inverting of the lens with the right concavity before inserting the contact lens into the wearer's eye.

Another objective of the present invention is to provide a contact lens insertion device which is capable of removing a contact lens from a storage container and transferring the contact lens from the insertion device to a user's eye without the user touching the contact lens with his fingers.

- 5 It is another object of the invention to promote the health and safety of the user by assisting him or her in avoiding contamination to his or her eyes through the use of contact lenses.

The present invention in one embodiment comprises a contact lens storage container having an upper chamber and a lower chamber. The upper chamber holds 10 the contact lens and the bottom portion of the upper chamber can be in the shape of a dome to positively position the lens in the upper chamber. The lower chamber is deformable and is located below the upper chamber and is connected to the upper chamber through at least one passageway or passageways between the upper chamber and the lower chamber.

- 15 When liquid is placed in the lower chamber, the lower chamber can be deformed such that liquid flows into the upper chamber through the passageways connecting the lower chamber and upper chamber. When liquid flows from the upper chamber into the lower chamber such that the upper chamber and dome are free of liquid, the lens is located on the dome on the bottom portion of the upper chamber. 20 This permits the lens to be removed using the contact lens inserting and handling device.

The inserting and handling device includes a main body. A suction cup is located at a first end of the main body and has an opening that leads to and communicates with a hollow portion of the main body. According to a first 25 embodiment of the inserting and handling device of the present invention, the main body has a deformable portion which allows a user to create a vacuum at the suction cup so as to permit the suction cup to grasp an object by the user deforming the deformable portion of the main body. In a second embodiment of the inserting and handling device of the present invention, a suction bulb is located on the main body 30 and permits the creation of a vacuum in a channel in the main body which connects with the opening in the suction cup. In this embodiment of the invention, a user can create a vacuum at the suction cup by squeezing or deforming the suction bulb.

The contact lens inserting and handling device of the present invention has a vacuum bleed hole in the main body of the device which allows a user to maintain a vacuum which has been created at the suction cap by placing the user's finger over the vacuum bleed hole. In addition, when the user's finger is removed from the
5 vacuum bleed hole any vacuum which was created at the suction cup is released, thereby permitting the release of the object which is held in position by the vacuum at the suction cup.

These and other objects of the present invention will be more readily apparent when taken into consideration with the following description and the attached
10 drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional side view of a storage container according to the present invention;

15 FIG. 2 is a sectional side view of a handling and inserting device according to a first embodiment of the present invention; and

FIG. 3 is a sectional side view of a handling and inserting device according to a second embodiment of the present invention.

20 **DETAILED DESCRIPTION OF THE INVENTION**

Referring now to the drawings in detail, wherein like reference numerals indicate like elements through the several views, there is shown in FIG. 1, a sectional side view of a storage container 1 in accordance with the present invention. The storage container 1 comprises an upper chamber 2 and a lower chamber 3. The
25 upper chamber 2 can be snap fit or screwed into the lower chamber 3. When the upper chamber 2 is snap fit into the lower chamber 3 the upper chamber can have a prong 26. In addition, the upper chamber 2 holds a contact lens 4 and a bottom portion 5 of the upper chamber 2 as shown in FIG. 1 has at the bottom thereof a dome 7 to positively maintain the position of the lens 4 in the upper chamber 2. The
30 lower chamber 3 has a deformable portion 6 and is located below the upper chamber 2 and is connected to the upper chamber 2 through at least one or more passageways 9 between the upper chamber 2 and the lower chamber 3.

When liquid 8 is placed in the lower chamber 3, the lower chamber 3 can be deformed such that liquid 8 flows into the upper chamber 2 through the passageways 9 connecting the lower chamber 3 and upper chamber 2. When liquid 8 flows from the upper chamber 2 into the lower chamber 3 such that the upper chamber 2 is free 5 of liquid, the lens 4 is becomes located on the dome 7 on the bottom portion 5 of the upper chamber 2. This permits the lens 4 to be removed by a user or a contact lens inserting and handling device.

The storage container 1 permits a user to invert or reverse the concavity of the lens. If a user intends to reverse the concavity of a lens which is originally concave 10 facing upwardly away from the container 1 as shown in FIG. 1, then he places the lens down into the liquid 8 in the storage container 1. When the lens contacts the dome 7 of the upper chamber 2, the lens 4 will reshape itself around the exterior of the dome 7 as seen in FIG. 1. The concavity of the lens 4 has now been reversed from the original configuration of being concave facing upward. The lens 4 can then 15 be picked up by a user or an inserting and transferring device since the concavity of the lens 4 is in the desired configuration.

The dome 7 in Fig. 1 is semicircular by way of example only and can be in a any of a variety of configurations which can accommodate the contour of a contact lens 4. Any structure which is capable of supporting the contour of a contact lens 4 20 can be located on the bottom portion 5 of the upper chamber 2 and be a contact lens supporting device such as the above-described dome. By way of example, the dome 7 in FIG. 1 can be formed from ribs which arch upward from the bottom portion 5 of the upper chamber 2. This permits air to be under the dome 7 and prevent the contact lens 4 from sticking to the dome 7 when a user attempts to lift the contact 25 lens 4 from the dome 7. The ribs can extend upwardly from the bottom portion 5 of the upper chamber 2 to an apex of the dome. The dome can be a continuous surface and have a texture formed by the ribs on the contour of the continuous surface.

The deformable portion 6 of the lower chamber 3 is shown in the form of a bellows or pleats which permit a user to squeeze or compress the deformable portion 30 6 such that the liquid 8 which can be a moisturizing liquid 8, such as a saline solution for the contact lens 4, flows through passageways 9 from the lower chamber 3 to the upper chamber 2. The deformable portion 6 of the lower chamber 3 need not only be in the form of a bellows but can be in a shape which permits a user to transfer liquid 8

from the lower chamber 3 to the upper chamber 2 either by the application of a force on the lower chamber 3 or the release of a force which is acting on the lower chamber 3. The deformable portion 6 can also take the form of an accordion shaped structure.

5 The passageways 9 also permit the passage of the moisturizing liquid 8 between the upper chamber 2 and lower chamber 3 when the position of the storage container is changed. It is also preferred that the passageways 9 be dimensioned and configured so as not to permit the contact lens 4 to pass through the passageways.

10 The passageways 9 can be in the form of holes or channels which are of a sufficient size to readily permit the passage of liquid 8 from the lower chamber 3 to the upper chamber 2. Also, the storage container 1 can be provided with a cap 10.

The first embodiment of the inserting and handling device 18 as shown in FIG. 2 includes a main body which is hollow body 11. A suction cup 12 is located at a first end of the hollow body 11 and has an opening 14 that leads to and communicates with a hollow portion 13 of the hollow body 11. The suction cup is shown fitted onto one end of the hollow body 11. According to this embodiment of the inserting and handling device 18 of the present invention, the hollow body 11 has a deformable portion 15. This allows a user to create a vacuum at the suction cup 12 so as to permit the suction cup 12 to grasp an object such as a contact lens by deforming the deformable portion 15 of the hollow body 11 until air is discharged from the opening, and then applying a lesser force on the deformable portion 15 of the hollow body 11 such that a vacuum is formed in the hollow body 11. When a user places his finger over vacuum bleed hole 16 on the hollow body 11 of the device to seal the vacuum bleed hole 16, the user can maintain a vacuum at the suction cup 12 since a vacuum or vacuum chamber has been created in the hollow portion 13 of the hollow body 11 and at the opening 14 of the suction cup 12.

When the user desires to release the object or contact lens held in the suction cup 12 of the inserting and handling device 18, the user can remove his finger from the vacuum bleed hole 16, thereby releasing any vacuum which was created at the suction cup 12 by the resulting flow of air from the atmosphere around the device 18 into the hollow portion 13 of the hollow body 11.

The suction cup 12 has a concave contour and is dimensioned and configured to receive a contact lens having a contour corresponding to the concave contour of the suction cup.

The deformable portion 15 of the hollow body 11 can be only a minor portion 5 of the hollow body 11 or can be substantially all of the hollow body 11 or any portion thereof. The deformable portion of the hollow body 11 which is to be deformed by a user can have a grip portion 17 as seen in FIG. 2 which facilitates a users grip on the hollow body 11. The grip portion 17 can be formed on the hollow body 11 and can be of any shape or texture which makes it easier for a user to grip the inserting and 10 handling device 18. The grip portion 17 can be formed from one or more channels 25.

The second embodiment of the inserting and handling device 19 as shown in FIG. 3 includes a main body 20. A suction cup 12 is located at a first end of the main body 20 and has an opening 14 that leads to and communicates with an axial 15 channel 21 which extends from a first end of the main body 20 to a second end of the main body 20. The suction cup 12 is shown fitted onto one end of the main body 20. According to this embodiment of the inserting and handling device 19 of the present invention, the hollow main body 20 has a bulb 22. The bulb 22 is flexible and can be formed from any known flexible material which is substantially airtight.

20 The bulb 22 allows a user to create a vacuum at the suction cup 12 so as to permit the suction cup 12 to grasp an object such as a contact lens by squeezing the bulb 22 until air is discharged from the opening of the suction cup 12 and then applying a lesser force on the bulb 22 such that a vacuum is formed in the axial channel 21 and at the opening 14 of the suction cup 12. When a user places his 25 finger over vacuum bleed hole 23 on the main body 20 of the device 19, the user can maintain a vacuum at the suction cup 12 since a vacuum or vacuum chamber has been created in the axial channel 21 of the main body 20 and at the opening 14 of the suction cup 12.

The main body 20 can be elongated and the bulb 22 can be located at one 30 end of the main body 20 while the suction cup 12 is located at another end of the main body 20. The inserting and handling device 19 can have a cover 24 for protecting the inserting and handling device 19 when the device is not in use.

When the user desires to release the object or contact lens held in the suction cup 12 of the inserting and handling device 19, the user can remove his finger from the vacuum bleed hole 23, thereby releasing any vacuum which was created at the suction cup 12 due to the resulting flow of air from the atmosphere around the device

5 19 into the axial channel 21 of the main body 20.

When a user or contact lens wearer intends to remove a contact lens from the storage container 1 and insert the contact lens 4 in the users eye, the user can follow the procedure set forth below. The user first opens the cap 10 of the storage container 1.

10 Next, the user deforms or squeezes the deformable portion 6 of the storage container 1 or changes the position or angle of the storage container 1 until the contact lens 4 is free of liquid. If the deformable portion 6 of the storage container 1 is deformed or squeezed then the liquid 8 can be made to flow to the lower chamber 3 such that the liquid 8 no longer covers the dome 7.

15 Using either the inserting and handling device 18 in FIG. 2 or the inserting and handling device of FIG. 3, the user positions the contact lens 4 on top of the dome 7 with the concavity of the lens 4 facing the dome 7. The user then holds either of the two embodiments of the inserting and handling device while the suction cup 12 is being held against the contact lens 4 and the deformable portion 15 or flexible bulb 22 of the inserting and handling device is squeezed. Then, when the vacuum bleed hole 23 or 16 of the inserting and handling device is plugged the user can grasp the contact lens 4 due to the formation of a vacuum inside the inserting and handling device when the user applies a lesser pressure on the inserting and handling device. The lens 4 can now be held against the suction cup 12.

20 When the lens is in position against the contact lens wearer's eyeball, the user can remove his finger from the vacuum bleed hole 23 or 16 and retract the instrument. Because the vacuum has been released between the contact lens 4 and the suction cup 12, the lens 4 will adhere and remain attached to the eyeball.

To remove the contact lens 4 from the eyeball, the user can use the suction cup 12 of the inserting and handing device to push the contact lens 4 to the side of the eye where eye tissue is less sensitive and therefore results in less pain to the wearer. The edge of the suction cup 12 can be inserted between the contact lens 4

and the eye tissue and the lens 4 can be lifted outward away from the eyeball. The user can now place the lens 4 in the upper chamber 2 of the storage container 1.

It will be recognized by those skilled in the art that changes may be made by the above-described embodiments of the invention without departing from the broad
5 inventive concepts thereof. For example, each of the features described above do not all need to be included in a single device. Rather, one or more features can be provided in a single device where desired and in any combination. It is understood, therefore, that this invention is not limited to the particular embodiment disclosed, but it is intended to cover all modifications which are within the scope and spirit of the
10 invention.